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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| EXAMINER | |
|---|---|
| RALIS, STEPHEN J | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 3742 | |

DATE MAILED: 10/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/500,855 | DE BOSSCHER ET AL. | |
| | Examiner | Art Unit | |
| | Stephen J. Ralis | 3742 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *19 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-10 and 12-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10 and 12-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 July 2005 and 19 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Amendment*

1. Applicant is notified of receipt and acknowledgement, on 19 July 2006, of the amendments to Application No. 10/500,855, filed on 16 July 2004.

### *Joint Inventors – Common Ownership Presumed*

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1, 3, 5, 6, 8, 9, 14, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ng et al. (U.S. Patent No. 6,756,600) in view of Abbott et al. (U.S. Patent No. 6,022,258).

Ng et al. disclose a method for heating and increasing heating power in a vacuum atmosphere in the presence of plasma (i.e. ionization of the gas and charging the ions in the gas; column 2, lines 65-67), comprising the steps: providing a radiation means (filament 18) in a vacuum chamber (i.e. arc chamber 12 contains a vacuum; column 2, lines 55-56); providing a first conductor to and a second conductor from the radiation means (i.e. conductor lines from filament 18 through insulators 20 and 22; see Figure 1); applying an electrical voltage across the radiation source (column 2, lines 62-67l column 3, lines 1-5, 30-36); and controlling a negative bias from power supply 31 that produces an arc over the filament 18 between the first conductor and the conductor from having an electrical voltage above +55 volts (i.e. 30-50 volts; column lines 3-5).

The claims differ from Ng et al. in explicitly calling for the radiation source (filament 18) being an infrared radiation source. However, utilizing an infrared radiation

filament source in an ion/plasma generating system, as described by Abbott et al., is known in the art. Abbott et al. teach an infrared radiation filament source (cathode filament 58 made of boron; column 5, line 63 – column 6, line 5; column 6, lines 61-64; boron being highly transmissive in the infrared region; column 3, lines 34-49) to reduce contaminants in previously used material, thereby enhancing the beam current by the lowering the level of contaminants; and to reduce the weight of the components and increase the durability of the components (column 2, lines 10-60), thereby increasing the operational efficiency and longevity of the radiation source filament. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Ng et al. with the infrared radiation source filament of Abbott et al. to reduce contaminants in previously used material, thereby enhancing the beam current by the lowering the level of contaminants; and to reduce the weight of the components and increase the durability of the components, thereby increasing the operational efficiency and longevity of the radiation source filament.

With respect to claims 3, 5, 6, 8, 16 and 17, Ng et al. further disclose the first conductor or the second conductor being kept electrically negative (negatively bias from arc power supply 31 to filament 18 via conductor though insulator 20; column 2, lines 62-67 column 3, lines 1-5, 30-36); the method further comprises the step of providing a first and second feed-through (i.e. insulator 20, 22) through which the first and second conductors enter the vacuum chamber (column 2, lines 56-58); the method further comprises the step of electrically isolating the first and second conductors (conductor

lines from filament 18 through insulators 20 and 22 inherently electrically isolate the conductor lines; see Figure 1).

With respect to claim 9, the Ng-Abbott method for heating in a vacuum atmosphere in the presence of plasma combination discloses the claimed invention except for wherein the method further comprising the step of electrically double isolating the first and second conductors. It would have been obvious to have one of ordinary skill in the art at the time the invention was made to electrically double isolate the first and second conductors, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art.

Furthermore, the Examiner notes that "preventing the electrical bias across the conductors" at filament 18 is accomplished by "controlling" the negative bias form the power supply 31. The Examiner notes that the term "control" is defined as to limit or restrict something[1] and if the controller is restricting or limiting the negative bias, it is in return restricting the electrical bias across the filament, therefore preventing the electrical bias to go above 30-50 volts in certain configurations.

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ng et al. (U.S. Patent No. 6,756,600) in view of Bluck et al. (U.S. Patent No. 6,101,972).

Ng et al. disclose a method of avoiding arcing in a vacuum atmosphere in the presence of plasma (i.e. method of increasing the ion source lifetime by reducing residue build-up, which causes electrical short circuits to the filament or as commonly

[1] Encarta® World English Dictionary (On-line), North American Edition; 14 Aug 2003.

known in the art, arcing) , comprising the steps: providing a vacuum chamber (i.e. arc chamber 12 contains a vacuum; column 2, lines 55-56); providing a plasma (i.e. applying an electrical voltage across the radiation source to get an arc discharge (column 2, lines 62-67; column 3, lines 1-5, 30-36); providing a first conductor to and a second conductor from the radiation means (i.e. conductor lines from filament 18 through insulators 20 and 22; see Figure 1); and controlling a negative bias from power supply 31 that prevents an arc over the filament 18 between the first conductor and the conductor from having an electrical voltage above +55 volts (i.e. 30-50 volts; column lines 3-5).

The claims differ from Ng et al. in calling for the first conductor and second conductor being prevented from having a positive electrical voltage. However, a first conductor and second conductor being prevented form having a positive voltage, as described by Bluck et al., is known in the art. Bluck et al. teach a plasma processing system and method comprising the first conductor and second conductor being prevented from having a positive electrical voltage (i.e. voltage bias fed to the filament is between 0 volts and about –150 volts, preferably –120 volts; column 3, lines 52-54) to improve substrate processing systems and methods wherein ion sources may operate in a stable manner in a processing chamber and wherein the properties of the deposited layers may be improved for their intended purposes, thereby providing a more efficient method of heating in a vacuum atmosphere. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Ng et al. with the

preventing of the voltage biasing of the filament to be positive of Bluck et al. to improve substrate processing systems and methods wherein ion sources may operate in a stable manner in a processing chamber and wherein the properties of the deposited layers may be improved for their intended purposes, thereby providing a more efficient method of heating in a vacuum atmosphere. (See Examiner notes with respect to "preventing" in claim 1, as described above)

7. Claims 2, 4, 7, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ng et al. (U.S. Patent No. 6,756,600) in view of Abbott et al. (U.S. Patent No. 6,022,258) as applied to claims 1 and 14 above, and further in view of Bluck et al. (U.S. Patent No. 6,101,972).

The Ng-Abbott method for heating in a vacuum atmosphere in the presence of plasma combination discloses all of the limitations, as described in claims 1 and 14 above, except for the first conductor and second conductor being prevented from having a positive electrical voltage; the first conductor and second conductor being kept electrically negative; and the vacuum chamber having walls, the method further comprising the step of electrically grounding the walls and the second conductor.

Bluck et al. teach a plasma processing system and method comprising the first conductor and second conductor being prevented from having a positive electrical voltage (i.e. voltage bias fed to the filament is between 0 volts and about –150 volts, preferably –120 volts; column 3, lines 52-54); the first conductor and second conductor being kept electrically negative (i.e. the bias on the filament is pulsed or biased in a

negative direction (i.e. both conductors are connected to the same bias; column 7, lines 50-65); and the vacuum chamber having walls (see Figure 1), the method further comprising the step of electrically grounding the walls and the second conductor (column 3, lines 25-31; see Figure 1) to improve substrate processing systems and methods wherein ion sources may operate in a stable manner in a processing chamber and wherein the properties of the deposited layers may be improved for their intended purposes, thereby providing a more efficient method of heating in a vacuum atmosphere. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the preventing of the voltage biasing of the filament to be positive, the first conductor being kept electrically negative and the grounding of the respective elements of the Ng-Abbott method for heating in a vacuum atmosphere in the presence of plasma combination with the negatively biased filament voltage; both the first conductor and second conductor being kept electrically negative; and the grounding of the chamber and conductors of Bluck et al. to improve substrate processing systems and methods wherein ion sources may operate in a stable manner in a processing chamber and wherein the properties of the deposited layers may be improved for their intended purposes, thereby providing a more efficient method of heating in a vacuum atmosphere.

8. Claim 10 rejected under 35 U.S.C. 103(a) as being unpatentable over Ng et al. (U.S. Patent No. 6,756,600) in view if Abbott et al. (U.S. Patent No. 6,022,258) as

applied to claim 9 above, and further in view of Golladay et al. (U.S. Patent No. 6,091,187).

The claims differ from the Ng-Abbott method for heating in a vacuum atmosphere in the presence of plasma combination in calling for the method further comprising the step of wrapping a metal shield around the first conductor and second conductor and connecting the shield to earth/ground.

Golladay et al. teach a high emittance electron source comprising the step of wrapping a metal shield (i.e. refractory metal radiation shield 19) around the first conductor and second conductor (i.e. conductor feeds to filament 14 wrapped by refractory shield 19; column 9, lines 32-35; see Figure 3) and connecting the shield to earth (i.e. grounded via ground to shield encompassing cathode 10 in connection with the frame holding refractory metal shield 19; see Figure 3) to reduce radiative heat losses, thereby proving a more efficient radiating source. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the conductor/filament structure of the Ng-Abbott method for heating in a vacuum atmosphere in the presence of plasma combination with the wrapping of refractory metal around the of Golladay et al. to reduce radiative heat losses, thereby proving a more efficient radiating source.

### *Response to Arguments*

9. Examiner accepts amendments to Drawings, Specification and Claims and respectfully withdraws the objections, accordingly.

10. Applicant's arguments, see page 8-9, filed 19 July 2006, with respect to the rejection(s) of claim(s) 1-13 under 35 USC §§ 102 and 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Abbott et al. (U.S. Patent No. 6,022,258) and the teaching of utilizing an infrared radiation filament source within an ion/plasma generating device.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Ralis whose telephone number is 571-272-6227. The examiner can normally be reached on Monday - Friday, 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on 571-272-4777. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Stephen J Ralis
Examiner
Art Unit 3742

SJR
October 2, 2006

Robin D. Evans
ROBIN EVANS
SUPERVISORY PATENT EXAMINER
10/16/06